CLASS XI Maths : Sample Paper-1

Allotted Time : 3 Hrs

Max. Marks : 100

Instructions

1. This questionnaire consists of **30** questions divided in four sections. Please verify before attempt.

2. **Section I** consists of 6 questions carrying 1 mark each; **Section II** consists of 7 questions carrying 2 marks each ; **Section III** consists of 11 questions carrying 4 marks each ; **Section IV** consists of 6 questions carrying 6 marks each.

3. All questions are compulsory and need to be attempted.

Section I

Q1. Write the following set in the set-builder form: {5, 25, 125, 625}

Q2. Let A and B be two sets such that n(A) = 3 and n (B) = 2. If (x, 1), (y, 2), (z, 1) are in A $\times$ B, find A and B; where x, *y* and z are distinct elements.

Q3. Let f be the subset of Z $\times$ Z defined by **f :=**{(ab, a + b): a, b $\in$ Z} Is **f** a function from Z to Z? Justify your answer.

Q4. Express the given complex number in the form *a + ib*: Z = (1 – i) – (–1 + 6i).

Q5. If 2x+ i (x - y) = 5, where x and y are real numbers, find the values of x and y.

Q6. Solve the given inequality for real *x*: 4x + 3 < 5x + 7.

Section II

Q7. How many 3-digit even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated?

Q8. Find the sum of odd integer from 1 to 21.

Q9. Write the equations for the *x* and *y*-axes.

Q10. A die is rolled. Let E be the event "die shows 4" and F be the event "die shows even number". Are E and F mutually exclusive?

Q11. A wheel makes 500 revolutions per minute. How many radians it turns in one second?

Q12. Write the value of tan 75°.

Q13. Solve the quadratic equation $25x^2 - 30x + 11 = 0$.

Section III

Q14. In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee?

Q15. Find the value of y in relation: $y = \lim_{x \to 0} \left(\frac{\sin ax}{\sin bx} \right)^2$

Q16. In how many of the distinct permutations of the letters in MISSISSIPPI do the four I's not come together?

Q17. Let the sum of n, 2n, 3n terms of an A.P. be S_1, S_2 and S_3 respectively, show that $S_3 = 3(S_2 - S_1)$.

Q18. Find coordinates of the foot of perpendicular from the point (3,-4) to line $4x - 15y + 17 = 0$.

Q19. Find the equation of the circle which passes though the points (3,7), (5,5) and has its centre on the line x - 4y = 1.

Q20. Find the equation of the circle which passes through the points (2, –2), and (3, 4) and whose centre lies on the line $x + y = 2$.

Q21. A group of two persons is to be selected from two boys and two girls. What is the probability that the group will have

(a) two boys   (b) one boy   (c) only girls

Q22. Find the point in XY-plane which is equidistant from three points A(2,0,3), B(0,3,2) and C(0,0,1).

Q23. A market research group conducted a survey of 1000 consumers and reported that 720 consumers like product A and 450 consumers like product B. What is the least number that must have liked both products?

Q24. Solve for x: $2 \cos^2 x + 3 \sin x = 0$.

Section IV

Q25. Find the centroid of a triangle, mid-points of whose sides are (1, 2, - 3), (2, 0, 1) and (- 1, 1, - 4).

Q26. If the ratio of the coefficients of 3rd and 4th terms in the expansion of $\left(x - \frac{1}{2x} \right)^n$ is 1: 2 then find the value of n.

Q27. Find the value of n so that $\left(\frac{a^{n+1}+b^{n+1}}{a^n+b^n}\right)$ may be the geometric mean between a and b.

Q28. The mean and standard deviation of six observations are 8 and 4, respectively. If each observation is multiplied by 3, find the new mean and new standard deviation of the resulting observations.

Q29. P, Q, R shot to hit a target. If P hits it 3 times in 4 trials, Q hits it 2 times in 3 trials and R hits it 4 times in 5 trials, what is the probability that the target is hit by at least two persons?

Q30. Find $(x + 1)^6 + (x - 1)^6$. Hence or otherwise evaluate $y = \left(\sqrt{2} + 1\right)^6 + \left(\sqrt{2} - 1\right)^6$

CLASS -XI Maths Sample Paper -2

Instructions

1. Questions 1 to 10 carry 1 mark each.

2. Questions 11 to 22 carry 4 marks each.

3. Questions 23 to 29 carry 6 marks each.

1. If X = {a, b, c, d} and Y = {f, b, d, g}, find

(i) X – Y
(ii) Y – X
(iii) X ∩ Y

2. The figure, shows a relation between the sets A and B. Write the relation in roster form.
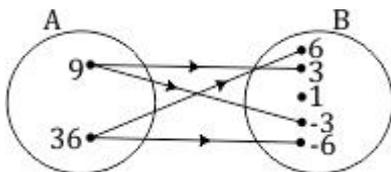
3. Let f, g: R → R defined by f(x) = 6x and g(x) = 3x. Find f - g.

4. Find the equation of the angle bisectors of the angle between the coordinate axes.

5. A bag contains 4 balls of different colours red, green, blue and yellow.A person draws two balls from the bag, one after the another without replacement. Describe the sample space for the experiment.

6. If cos x = cos y, then x = ?

7. How many different signals can be made using 3 flags at a time from 5 flags of different colours?

8. Find the value of cos 35° + cos 145° + cos 330°.

9. Evaluate : sin 130° cos 110° + cos 130° sin 110°.

10. Find the sum of the series : 3 + 8 + 13 + ... + 33.

11. Prove that : tan 30° + tan 15° + tan 30°.tan 15° = 1.

12. Solve cos 2θ – cos θ = 0.

13. If U = {1,2,3,4,……..,10} is the universal set for the sets A = {2,3,4,5} and B = {1,2,3,4,5,6}, then verify

that $(A \cup B)' = A' \cap B'$.

14. Find the domain and the range of the real function f defined by $f(x) = |x - 1|$.

15. Express the given complex number in the form $a + ib$: $\left(\dfrac{1}{3} + 3i\right)^3$.

16. What is number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these
(i) four cards are of the same suits,
(ii) are face cards.

17. Show that the sum of $(m + n)^{th}$ and $(m - n)^{th}$ terms of an A.P. is equal to twice the mth term.

18. Without using distance formula, show that points $(-2, -1)$, $(4, 0)$, $(3, 3)$ and $(-3, 2)$ are vertices of a parallelogram.

19. An arch is in the form of a parabola with its axis vertical. The arch is 10 m high and 5 m wide at the base. How wide is it 2 m from the vertex of theparabola?

20. Find the equation of the circle which passes through the points $(2, -2)$, and $(3, 4)$ and whose centre lies on the line $x + y = 2$.

21. A and B are two students. Probabilities of solving a problem by A and B separately are 5/9 and 7/11 respectively. Find the probability that the problem will be solved.

22. Find lengths of the medians of the triangle with vertices A $(0, 0, 6)$, B $(0, 4, 0)$ and $(6, 0, 0)$.

23. Let A = {9, 10, 11, 12, 13} and let f: A $\rightarrow$ N be defined by $f(n)$ = the highest prime factor of n. Find the range of f.

24. Show that $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2\cos 8\theta}}} = 2\cos\theta$

25. A owner of a land has 3000m of fencing with which he wishes to enclose a area of rectangular piece of grazing land along a straight portion of a river. Fencing is not required along the river. What could be the possible values of the breadth of the rectangular piece of grazing land if its length is along the river.

26. The coefficients of 2nd, 3rd, 4th terms in the expansion of $(1 + x)^n$ are in A.P. Find n.

27. If the pth, q^{th} and r^{th} terms of a G.P. are a, b and c, respectively. Prove that a^{q-r}, b^{r-p} and $c^{p-q} = 1$.

28. Prove that $10^{2n-1} + 1$ is divisible by 11 for all $n \in N$.
29. The mean and standard deviation of a group of 100 observations were found to be 20 and 3, respectively. Later on it was found that three observations were incorrect, which were recorded as 21, 21 and 18. Find the mean and standard deviation if the incorrect observations are omitted.

XI Maths Sample Paper -3

Instructions

1. Questions 1 to 10 carry 1 mark each.

2. Questions 11 to 22 carry 4 marks each.

3. Questions 23 to 29 carry 6 marks each.

1. Write down all the subsets of the following set: {1, 2, 3}.

2. Let A = {1, 2, 3, 4} and B = {10, 12, 13, 14, 20}. Whether f: A → B defined by f(1) = 10, f(2) = 12, f(3) = 13 is a function?

3. If n(A) = 3 and n(B) = 3, then find n(A x B).

4. Find the multiplicative inverse of the complex number –i.

5. Write the first two terms in the following series. $T_n = n^3 - 1$, if n is odd and $T_n = n + 1$ if n is even.

6. Tickets are numbered from 1 to 25. They are well shuffled and a ticket drawn at random . What is the probability that the drawn ticket has a prime number?

7. Given $P(A) = \dfrac{3}{5}$ and $P(B) = \dfrac{1}{5}$. Find P(A or B), if A and B are mutually exclusive events.

8. Find the slope of a line which passes through (1,2) and (-3,4)?

9. Write the value of tan 15°.

10. Evaluate : sin(40°+θ) cos(10°+θ) - cos(40°+θ) sin(10°+θ)

11. Prove that $\dfrac{\cos 9x - \cos 5x}{\sin 17x - \sin 3x} = -\dfrac{\sin 2x}{\cos 10x}$

12. Find the value of cos 35° + cos 145° + cos 330°.

13. Let A,B and C be the sets such that A∪B = A∪C and A∩B = A∩C. Show that B=C.

14. Let A and B be two sets such that n(A) = 3 and n (B) = 2. If (x, 1), (y, 2), (z, 1) are in A × B, find A and B, where x, *y* and z are distinct elements.

15. If $\left(\dfrac{1 + i}{1 - i}\right)^m = 1$, then find the least positive integral value of m.

16. How many numbers of 6 digits can be formed out of the digits of the numbers 567724? How many of the

numbers so formed is even?

17. Find the sum to n terms of the A.P., whose k^{th} term is 5k + 1.

18. Find the equation of the line perpendicular to the line 2x – 3y + 7 = 0 and having x-intercept 4.

19. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$, where one vertex is at the vertex of the parabola. Find the length of the side of the triangle.

20. Find the equation of the hyperbola satisfying the give conditions: Foci $(0, \pm \sqrt{10})$, passing through (2, 3).

21. The probability that a person visiting a doctor will have his blood testdone is 0.75 and the probabilitythat he will be admitted is 0.30. The probabilitythat he will have his blood test done or be admitted is 0.45. Find the probabilitythat a person visiting the doctor will have his blood test done and be admitted?

22. Are the points A(3, 6, 9), B(10, 20, 30) and C(25, -41, 5) the vertices of a right angles triangle?

23. Let A = {1,2}, B = {1,2,3,4}, C = {5,6} and D = {5,6,7,8}
Verify that :
(a) A × (B∩C) = (A×B)∩(A×C)
(b) A × C is a subset of B × D.

24. Prove that: $\cos 6x = 32 \cos^6 x - 48 \cos^4 x + 18 \cos^2 x - 1$.

25. How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

26. If a and b are distinct integers, prove that a – b is a factor of $a^n - b^n$, whenever n is a positive integer.

27. Find the sum of all numbers between 200 and 400 which are divisible by 7.

28. Prove the following by using the principle of mathematical induction for all $n \in N$:

$$1.3 + 2.3^2 + 3.3^3 + \ldots + n.3^n = \frac{(2n-1)3^{n+1} + 3}{4}$$

29. Find the mean deviation about the mean for the data

x_i	10	30	50	70	90
f_i	4	24	28	16	8